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HYBRID DIELECTRIC RESONATOR ANTENNA FOR C-BAND APPLICATION

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Abstract:
This article presents a triple band hybrid cylindrical Ring Dielectric resonator antenna. The proposed antenna consists of Ring Dielectric resonator antenna and has a reformed pentagon shaped slot antenna. By the help of HFSS simulation software this proposed antenna has been designed. The return loss of the proposed antenna is -16dB, -20dB, -15dB respectively at frequency of 4.7GHz, 6.1GHz, 7.5 GHz respectively. The proposed antenna is applicable for c-band applications.

Keywords: *Slot Antenna; Ring Dielectric Resonator Antenna; Gain, Radiation Pattern; C Band Applications.*

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1. Introduction

Dielectric resonator antenna provides many benefits more than conventional antenna, hence these are fascinating antenna element such as high radiation frequency, low cost, small size, negligible metallic losses, flexible to different excitation arrangements and wider impedance bandwidth [1]-[3].Various applications namely video conferencing, wireless, direct digital broadcasting, radar and satellite applications. DRA wideband is attainment for low values of dielectric constant [2] as the bandwidth of the DRA is conversely proportional to the dielectric constant. The DRA can be available in different shapes cylindrical rectangular, hemispherical [6]-[7]. During research work multiband featured such as pentagon, stair rectangular DRA are also obtained from different shapes [8]-[9]. Out of these elementary shapes, cylindrical DRA is highly used because of its extensive commercial obtain ability and diversified radiation pattern.

2. Antenna Design

Figure 1 shows structure of annular shape microstrip feed with a ring DRA with reformed pentagon slot antenna. The proposed antenna is designed on an inexpensive FR4 substrate having dielectric constant of ε_r 4.4, thickness h_s =1.6, loss tangent 0.02. The length and width of the

ground plane and substrate are 50mm x 50mm. The outer diameter D_O of the DRA is 22mm and the internal diameter D_I of the DRA. H is the height of the DRA is 11mm.

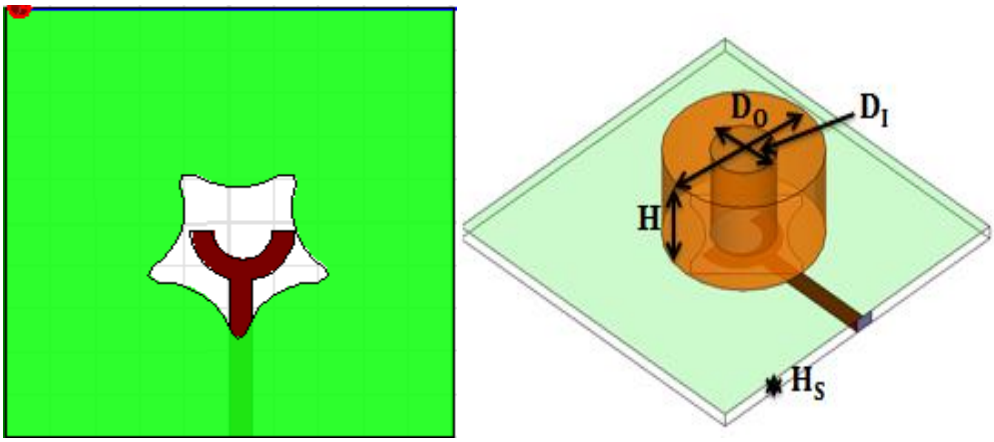

Figure 1: Structure of proposed antenna

3. Simulation Results

The simulation was carried out using Ansoft HFSS simulation software. Simulated return loss is shown in Figure 2. Simulated return loss is -16dB, -20dB, -15dB respectively at frequency of 4.7GHz, 6.1GHz, 7.5GHz respectively.

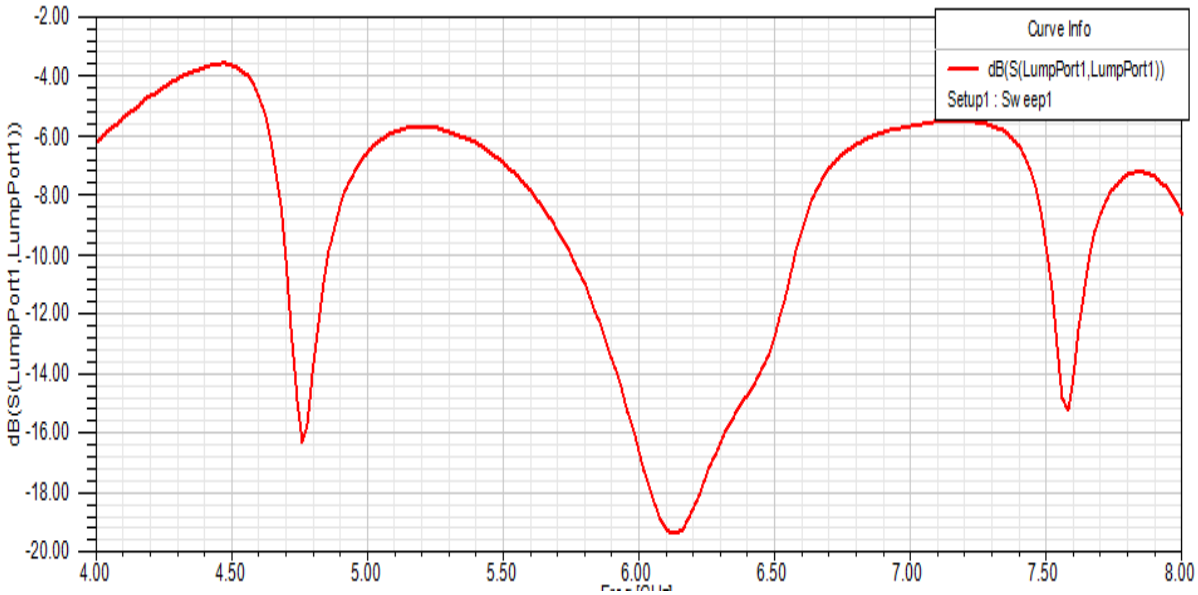

Figure 2: Simulated return loss

Below shown all four Figures 3(a),3(b) and 3(c) shows the radiation pattern of the proposed radiator at frequency 4.7GHz, 6.1GHz, 7.5 GHz respectively.

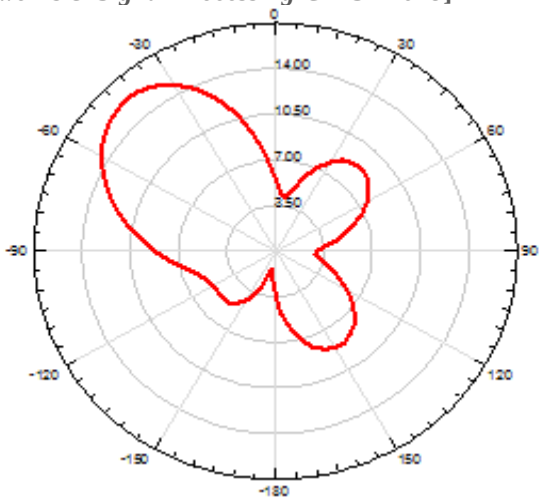

Figure 3: (a) Radiation pattern at 4.7GHz

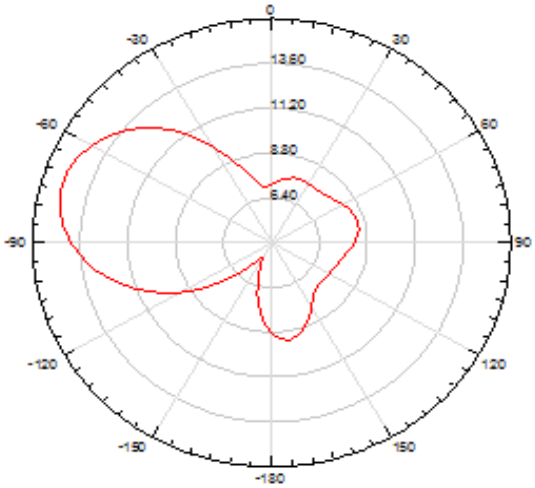

Figure 3: (b) Radiation pattern at 6.1GHz

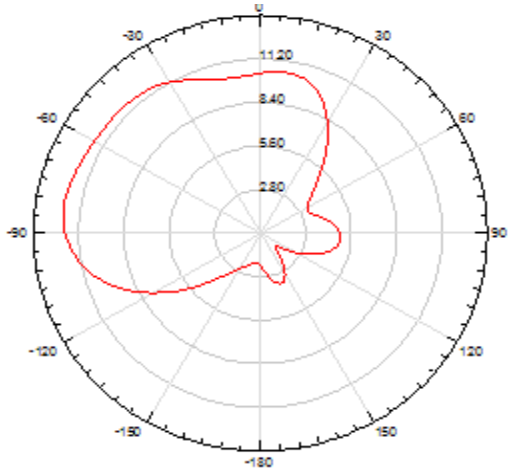

Figure 3: (c) Radiation pattern at 7.5 GHz

Figure 3 indicates VSWR v/s recurrence bend at a specific width of ground plane. The value of VSWR is found to be

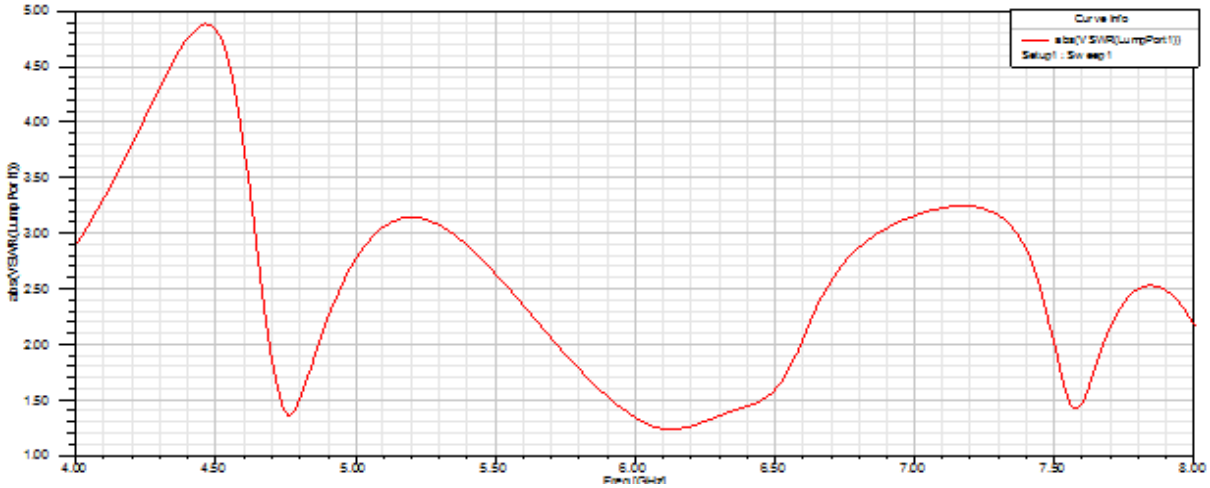

Figure 4: Variation of VSWR v/s Frequency

4. Conclusion

A Triple band integrated Ring Dielectric Resonator Antenna has been shown in this research work. The important features of the proposed antenna generating Triple band. Simulated characteristics of proposed antenna shows improved return loss which has the capabilities to support C band applications.

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